

PATENT SPECIFICATION

DRAWINGS ATTACHED

894081



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COMPLETE SPECIFICATION

An improved Technique and means for Rendering Printed Information Invisible

We, VAN VALKENBURGH, NOOGER & NEVILLE, INC., a corporation of the State of New York, United States of America, of 15 Maiden Lane, New York 38, New York County, New York, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention is concerned with the concealment of printed information which lies substantially in a single plane by the techniques of optical confusion.

It is well known that if printed or similar information is to be concealed from visual observation, one of the most effective methods of doing so is to cover it completely with an opaque shield. This method of concealment, however, has several disadvantages which are not altogether apparent on first glance. In regard to large areas, the most important disadvantage is the fact that any shield must be as massive or large in area as the information to be hidden. When printed matter on a sheet material such as paper, is to be concealed by an opaque shield, which opaque shield may be applied by conventional graphic arts methods, difficulties are encountered. These difficulties arise through the fact that thin films or multi-layers thereof containing so-called "opaque" pigments are rarely truly opaque to both reflected and transmitted light. These thin films are ordinarily between about 4 and about 75 microns in thickness. The concealed printed matter may be revealed by reflected light or what is hereinafter referred to as "show through" or the printed matter may be revealed by transmitted light which is hereinafter referred to as "see through". While "see through" and "show through" may be minimized by the application of a plurality of layers of concealing media or a single layer of sufficient thickness, such methods of application of such media contribute to the cost and complexity of

manufacturing concealed units. In addition, it has been the prior art practice to resort also to additional shielding media on the back side of the printed sheet to minimize "see through" observation.

It is the principal objects of the present invention to provide a method and means for temporarily concealing both small and large areas of printed information by optical confusion, without resorting primarily to the use of substantially completely opaque shields, and in particular, it is the object of this invention to provide means for temporarily concealing printed information which invention represents an improvement over the subject matter disclosed in our co-pending application No. 33134/57 (Serial No. 851,744).

It is a further object of the present invention to dispose a confusing shield adjacent to the matter to be hidden, and between such hidden matter and the point of observation, wherein the matter to be hidden is composed of an intersticed or screened pattern, which pattern cooperates with the confusing shield and thus contributes to and enhances optical confusion so as to improve concealment of the hidden matter. On the other hand, the intersticed or screened pattern constituting the hidden matter is of such nature to permit its observation upon removal of the interposed confusion shield.

It is a further object of the instant invention to provide a method and means for temporarily securing separate items of printed information against view and for selectively exposing individual items of such information to view wherein the matter to be hidden is composed of printed information in which the letters or symbols thereof are made up of screened patterns, irregular or otherwise, of suitable colours; the hiding of such printed information is effected by printing or otherwise superimposing a shield thereover either of substantially solid and opaque material or preferably of a confusing pattern in the manner described and claimed in the fore-

going co-pending application; furthermore the shield is such that it is sectionally removable so that individual items of printed information hidden thereby may be exposed to view by removal of that portion of the shield overlying the particular item of information desired to be seen.

It is a further object of the present invention to provide economical and effective means for concealing printed matter from being revealed by means of reflected light and/or transmitted light through the application of printing ink applied by printing methods.

Other objects and advantages of the present invention will be apparent from the following description taken in conjunction with the drawings, in which:

Fig. 1 shows a column of printed information wherein the lettered numbers are screened in accordance with the instant invention and which numbers are to be temporarily hidden from view;

Fig. 2 shows a column of printed information according to the prior art;

Fig. 3 shows another column of information printed in accordance with the instant invention;

Fig. 4 shows the practice of the invention wherein the hidden information, screened numbers, is obscured from view by a confusing shield and wherein a section of the shield is removed so as to expose to view a selected number;

Fig. 5 is similar to Fig. 4 except that it employs a confusing shield of different design;

Fig. 6 is similar to the preceding two figures except that it employs a relatively solid opaque shield;

Fig. 7 is a reproduction of a printed chart forming part of a simulator apparatus and setting forth the problem to be answered together with columns of answers or other items of information printed and concealed in accordance with the practice of the instant invention; and

Fig. 8 is a reproduction of another type of answer chart made in accordance with the instant invention.

Broadly stated, the present invention contemplates a process and apparatus for concealing printed information from visual observation by means of optical confusion. One method involves disposing an optical confusion shield between the information to be concealed and the point of observation. The confusing shield may comprise a plurality of light absorbing or light transmitting areas, such as, lines, forms or spots separated from one another by physical or optical interstices, or light reflecting patterns or light scattering or diffracting patterns. For any given structure the confusing shield may advantageously combine any one or more elements of color, form, size, orientation and contrast which will best conceal the structure by optical confusion as to the interpretation of

the image obtained on the human retinal screen.

In carrying the invention into practice, a confusing shield as contemplated in the co-pending application is preferably positioned upon or applied directly to the printed information to be hidden, or if the shield is to be separated from the information to be hidden thereby, such separation is substantially no greater than the thickness of an ordinary ink film. The confusing shield may take the form of a regular geometric pattern of light-absorbing figures interspersed with unprinted dots or spaces. It will be understood that the pattern for the shield may also be irregular and of diverse areas and shapes and of suitable colors. In selecting the pattern to be used one should, for optimum results, take into account the size, shape, color or pattern of the subject matter to be hidden thereby. If the means or sheet-like material supporting the printed information is of transparent material, such as a thick plastic film, an additional confusing shield may be applied on the back surface of the transparent material opposite the printed information to be concealed.

Normally, the matter to be hidden will be composed of separate items of printed information and, thus, it will be usually desirable to expose certain of such items of information to view while the other items remain hidden. This characteristic is particularly desirable when the invention is used to compose response apparatus as shown in co-pending application No. 26320/56 (Serial No. 825,227) and application No. 28427/57 (Serial No. 858,194); note in particular the response charts shown in said patent applications. To achieve this result the confusing shield may be made of a suitable ink which allows printing of same over the information to be hidden and which may be removed segment-wise when desired. To effect economy and practicability, the selected ink may be of a type that can be applied to the chart-like means on which the information to be hidden is printed by ordinary discontinuous printing processes. Consequently the invention as illustrated herein contemplates an ink concealing shield characterized by being removable segment-wise by a mild abrasive means such as a pencil eraser, which does not substantially affect the underlying printed information whether the latter be a letter, number, symbol, illustration or other printed form. In this manner, only the item desired to be seen will be exposed to view by removal of the portion of the shield overlying same.

Referring now to Figs. 1 and 3, it will be understood that to practice the instant invention it has been found advantageous to print the matter to be concealed in a discontinuous form, that is to say, each of the items of printed information to be hidden temporarily from view itself will be made of a confusion pattern. As a result, the printed information itself

contributes to the hiding qualities effected by the entire structure by means of cooperating with its overlying shield. It will be understood that the printed information to be hidden may be colored, contoured, oriented, scored or otherwise contrasted with its shielding layer so as to present the maximum confusion pattern to effect the best hiding qualities and, therefore, achieve the object of concealing printed information. Thus, it is within the contemplation of the present invention to conceal printed structures such as separate items of printed information by composing same as of a plurality of dots, bars, squares or other patterns, regular or irregular in shape, and separated by interstices upon which a suitable confusion shield is superimposed intermediate the observer and the information concealed thereby, which shield takes on the form as outlined in the co-pending application. The type of overlying confusion shield to be used and the area and shape of the item of printed information to be hidden thereby should be taken into consideration in the selection of the color, form, size and shape of the printed pattern composing the information to be concealed so as to effect optimum concealment. In other words, the selection of the shield and the selection of the individual symbols composing the printed matter should be regulated by the fact that each should complement the other to effect optimum concealment.

A particular advantage of the embodiment of the instant invention is that it permits the use of a screened printed pattern which can be most advantageously applied by photo-engraving or lithographic techniques in combination with letterpress printing methods or photo-lithographic methods. In the illustrated embodiment, the information to be hidden is composed of a system of dotted or checkered printed spots. It is possible to vary the tone of the printed pattern by printing same through various gradations so that the separate items of printed information are usually nearly visible to the naked eye when uncovered, but by suitably selecting a tone, the printed information, for example a letter, word, ideograph or symbol may be more effectively concealed from view against reflected and transmitted light when covered by the overlying and shielding confusion pattern.

Fig. 1 shows a column of information, in this instance lettered numbers, provided in accordance with the instant invention, and which numbers are to be subsequently hidden from view. The numbers in the upper portion of Fig. 1, indicated by reference E, are composed of letters made up of separate, distinct dots identified in the trade as screen No. 85, 70% density. In the printing trade, the screen number depicts the size of the printed area, such as the dots, whereas the percentage determines the density of dots in a given area. The lower half of the column, depicted by

reference F, is made up of letters composed of 85 screen but 40% density and thus is not easily seen as the numbers depicted by E. The second column, Fig. 2, sets forth printed numbers in accordance with co-pending application, which numbers are composed of continuous, block or solid letters to be hidden by a confusion pattern. The third column, Fig. 3, at the upper portion and depicted by G shows letters to be hidden from view and printed in accordance with the instant invention, wherein the letters are composed of printing of 100 screen and 40% density whereas H depicts letters of 100 screen and 60% density. It is thus seen as the density increases, visibility of the letter to the naked eye increases likewise.

Fig. 4 illustrates a column of screen printed information hidden by a confusing shield 1. A section of the shield is removed so as to expose to view a selected answer, "25-1". It will be understood that the answer is printed on a suitable medium whereas shield 1 is an overlayer of ink printed directly upon the answers.

Fig. 5 illustrates the invention wherein the confusing shield is of different design. In Fig. 6, the overlayer of ink is an opaque shield 2 used in place of the confusing shield of the preceding figures.

The instant invention has noteworthy application to simulator apparatus particularly of the type disclosed in the aforesaid patent applications by reason of the fact that it provides improved "show through" and "see through" characteristics. This measurably improves the answer chart employed in the simulator apparatus wherein "show through" and "see through" play an important, if not critical role. Reference is now made to Figure 7 which illustrates an answer chart corresponding to the chart shown in Figure 3 of our copending Application No. 32998/57 (Serial No. 851,939).

For the purpose of instruction, a prepared problem 21 is printed on chart 20 of the answer sheet and this problem is the same as that in the answer chart of Application No. 32998/57 (Serial No. 851,939) and is concerned with the same electronic equipment as illustrated in Figures 1 and 2 of that application. Chart 20 is provided with a number of columns of printed answers 22 through 29. The answers are printed directly on a suitable medium such as cardboard or paper. The numbers constituting the answers are screen printed. The answer columns are hidden from view by correlated overlayers of printed confusing shields except that in columns 27, 28 and 29 the overlying shields are relatively solid and opaque. As noted in the aforesaid applications and patent, the overlying shields are sectionally removable so that individual answers may be selected by removing only that portion of the overlying shield and so as to expose the selected answer without disturbing the portion of the shield

overlying adjacent answers. The printed answers are prearranged to correlate the equipment under study with problem 21. Tabular information in the nature of the headings for each column and symbols or reference numbers alongside the hidden or obscured answers correlate the answers with the information set forth on charts 10 and 11 shown in Figures 1 and 2 of Application No. 32998/57 (Serial No. 851,939).

The embodiment of Fig. 8 discloses a self-instruction problem simulator of a multiple choice variety but of more complex nature in that the problem is made up of related and sequential study problems illustrated as steps 1 through 14. The simulator is constituted by a chart 40 and in this example applies to the field of celestial navigation. Chart 40 is meant to be used in conjunction with the regular tools of the navigator's trade, namely, a dead reckoning kit (computer, plotter, dividers, maps, etc.) charts, celestial tables for a particular period and, if available, the form used by the navigator for celestial precomputation and solution.

The sequential steps of simulator 40 are related, that is to say, each step is an individual study problem or question related to the lower and higher numbered study problems to the extent that a correct answer for one question is required before the next study problem of the sequence can be properly solved. This condition simulated accurately the usual pattern of technical problems.

The process of determining a celestial navigation fix has been pre-established on the basis of the 14 steps shown in chart 40. Step 1 provides the user with the flight planning information that would normally be provided by the instructor or obtained from an airport operations office; namely, date, time of departure, departure point, destination, indicated airspeed, temperature, etc. Upon obtaining this information, the user can establish a track on his chart and write it down on his precomputation form. This information is obtained from simulator chart 40 by means of the user going of Step 1—departure point, destination, winds, visible opposite the information he thinks pertinent. Responses are concealed and individually exposable in the manner as noted hereinbefore. Throughout the example, the user can be required to write down alongside each data response his sequence. For illustrated purposes, in Step 1, the data: date, indicated airspeed, temperature and sextant error are visible.

Step 2 requires the user to compute ground-speed and true heading of his aircraft. Ground-speed is computed from the data responses gathered from Step 1—indicated airspeed, altitude, winds, etc. In like manner, true heading is also computed from the data responses of Step 1—departure point, destination, winds. Once the user computes these two values, he

registers his computations by erasing the overlying material in Step 2 of Fig. 8 at the junction of the ordinates of his computed values, see reference number 41. In effect, the user selects from a large number of available answers that which he believes to be the correct answer, as determined by his computations.

If his computations are not correct, the user will receive a response such as a "minus" sign or a coded response which tells him and subsequently an instructor that his computations were wrong. When the user uncovers an incorrect response, he naturally must go back and correct himself. Step 2 reveals, for illustrative purposes, three incorrect responses 42, 43, 44. Reference 42 is a "minus" sign whereas references 43 and 44 are, respectively, dagger *a* and dagger *b*. In addition, dagger *a* and dagger *b* are correlated with footnotes which refer the student to a particular page of a textbook or other instructional reference material pertinent to this phase of the problem wherein the student will find theory or information explaining the correct method of solving the problem. In other words, the responses may be coded to guide the student to explanatory or reinforcing reference material to assist the student in understanding why or how his answer is incorrect. On the other hand, when the user is told that his computations are correct by the selection of dagger *c*, reference 41, he is provided with data required for the solution of the next step or problem. Examination of steps 3 through 13 will reveal additional visible response information supplied to the user as he proceeds to compute correct responses at each of the stages of this sequential problem wherein ultimately the user arrives at the ultimate solution.

Again, it will be noted that certain of the covering shields employ the confusion pattern such as shown with respect to steps 1 through 11, whereas other of the steps employ the relatively opaque and solid shield as shown in respect to steps 12 through 14. In each case the responses are made up of screen printed letters.

The completion of the mission simulated includes the calculation of latitude and longitude, estimated time of arrival (ETA), Greenwich Hour Angle of Aries, Greenwich Mean Time, the shooting of three celestial bodies with the sextant and the subsequent correction of heading and estimated time of arrival at final destination (step 14).

A score scale 45 allows the user to determine his grade at completion of the mission. At the conclusion of the study problem, the student tallies the number of erasures and refers to the self-scoring column 45 alongside of which are key symbols, such as 1, 2, 3 through 29. The score column consists of a removable ink shield under which are predetermined score responses made up of screen

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75

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85

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95

100

105

110

115

120

125

130

printed letters. For example, if there are 18 erasures, the score of 70% is exposed to indicate the mark or grade received for the particular test. The score responses are predetermined so that the number of erasures made by the student will accurately reflect his qualitative grade.

WHAT WE CLAIM IS:—

1. Apparatus for securing printed information against view and for selectively exposing same to view, said apparatus comprising a sheet-like supporting member having a plurality of separate items of information printed thereon, the letters and/or symbols of said printed information being of a pattern comprising discrete printed areas separated by interstices so as to define lettering of screen and density discernible by the naked eye, a concealing shield overlying said printed information and being disposed between said printed information and the point of observation, said shield being removable segment-wise, whereby individual items of said printed information may be rendered selectively visible by removal of that portion of the shield covering the individual item of printed information selected for exposure.

2. Apparatus for the instruction of a student concerning multi-component equipment and for checking and recording the student's responses to a problem based upon equipment comprising, a chart disclosing the components of said equipment, said components being identified by symbols on said chart, a response chart having printed thereon a plurality of responses to the problem, the letters and/or symbols constituting the responses being of a pattern comprising discrete printed portions separated by interstices of suitable magnitude thereby defining letters of screen and density discernible by the naked eye, said responses simulating predetermined conditions of operation of the equipment under study, said symbols also appearing on said response chart, respective ones of said symbols being associated with correlated responses to assist in the selection of individual responses, and a removable ink shield printed directly on said responses for concealing same against view, said shield being sectionally removable whereby individual responses may be selected by removal of the portion of the shield overlying the selected response, the imprinting of said responses on said chart being characterized to resist obliteration of the responses upon removal of the overlying ink shield.

3. Self-instruction and self-recording apparatus adapted for a study problem of the multiple choice answer variety which problem is to be solved by a person, said apparatus comprising a suitable medium having a plurality of coded responses printed thereon, the letters and/or symbols constituting said responses being of a pattern comprising discrete printed portions separated by interstices

of suitable magnitude thereby defining letters of a screen and density discernible by the naked eye, a plurality of key symbols printed on said medium and correlated to respective ones of said responses to permit the selection of individual responses, said responses being coded to convey information to a person, certain of said responses correlating said study problem with applicable informational reference material and thereby providing means for reinforcing the person's information concerning the study problem, and means maintaining said responses concealed and capable of being selectively altered to render individual responses unalterably visible.

4. Self-instructing, self-recording and self-scoring apparatus for a study problem of the multiple choice answer variety, which problem is to be solved by a person, said apparatus comprising a suitable medium having a plurality of coded responses printed thereon, the letters and/or symbols constituting said responses being of a pattern comprising discrete printed portions separated by interstices of suitable magnitude thereby defining letters of a screen and density discernible by the naked eye, said medium having a plurality of key symbols printed thereon and being correlated to respective ones of the said responses to permit selection of individual responses, said responses being coded to convey information to a person, score responses based upon the number of responses available for selection and being printed on said suitable medium, a plurality of score symbols on said medium and adapted to correlate a tally of selected responses with respective ones of said score responses, and a shield concealing said coded responses and score responses and capable of being sectionally altered so that individual responses are rendered unalterably visible whereby the person may determine his own score at the completion of the study problem.

5. Apparatus as claimed in Claim 4, wherein certain of said coded responses correlate the study problem with applicable informational reference material and thereby provide means for reinforcing the person's information concerning the study problem.

6. Apparatus as claimed in any one of the preceding claims in which the shield comprises an ink shield printed directly upon said letters and/or symbols.

7. Apparatus as claimed in any one of the preceding claims in which said shield comprises a removable ink which is substantially solid and opaque.

8. Apparatus as claimed in any of the preceding Claims 1 to 5, in which the shield comprises a removable ink in the nature of a confusion pattern.

9. Apparatus as claimed in Claim 8, wherein the shield comprises an intersticed design forming an optical confusion pattern.

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100

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120

125

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10. Apparatus as claimed in Claim 9, wherein the confusion pattern is a light absorbing pattern.
- 5 11. Apparatus as claimed in Claim 9, wherein the confusion pattern is a light reflecting pattern.
12. Apparatus as claimed in Claim 9, wherein the confusion pattern is a light scattering pattern.
- 10 13. Apparatus as claimed in any one of Claims 1 to 4, which apparatus is substantially as described with reference to the accompanying drawings.
- 15 14. A method for producing an apparatus according to any one of the preceding claims for the self-instruction and/or testing of the accuracy of answers of trainees in the solving of a complicated problem or system, such as circuit tracing and fault finding in multi-component electronic equipment, said method comprising the steps of pre-establishing data which
- relates to the operation and characteristics of said problem or system, assigning symbols to such data which correlate that data with individual components of or questions concerning said problem or system, printing said information in the form of discontinuous patterns on suitable sheet-like means, each item of information being of a pattern comprising discrete printed areas separated by interstices so as to define a printed symbol of screen and density dimensions discernible by the naked eye, and overlying directly such printed information with a concealing shield so as to hide temporarily said information, said shield being intermediate the hidden information and the point of observation.
- 25 30 35

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Fig. 1.

22-4
24-5
25-1
25-4
30-2 } E
32-4
34-2
35-4
36-3
37-2
39-3
39-6
40-2
44-1 } F
45-1
47-2
47-3
47-5
50-1
52-4

Fig. 2.

22-4
24-5
25-1
25-4
30-2
32-4
34-2
35-4
36-3
37-2
39-3
39-6
40-2
44-1
46-1
47-2
47-3
47-5
50-1
52-4

Fig. 3.

70-4
71-3
72-4
73-1 } G
76-3
79-2
82-5
83-2
83-3
86-2
90-1
93-3
97-4
82-5 } H
83-2
83-3
86-2
90-1
93-3
97-4

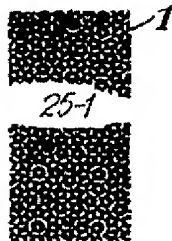
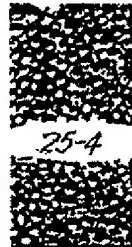
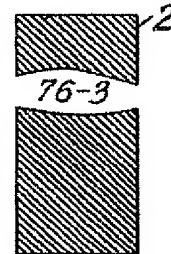
Fig. 4.*Fig. 5.**Fig. 6.*

Fig 7.

21 Trouble

THE PUSH-PULL AMPLIFIER DOES NOT OPERATE AT ALL. ABSOLUTELY NO SOUND COMES FROM THE LOUDSPEAKER. INSPECTION REVEALS THAT ALL THE TUBES ARE WARM, AND THERE IS NO OBVIOUS PHYSICAL DAMAGE. LOCATE AND REPLACE THE PART CAUSING THE TROUBLE.

Remedy

RESULT OF PART REPLACEMENT

SR = SYMPTOMS REMAIN

TC = TROUBLE CORRECTED

22

PART	RESULT
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

23

PART	RESULT
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	

24

TEST POINT	RESISTANCE	TEST POINT DATA	VOLTAGE
V-1	1.		
	2.		
	3.		
	4.		
	5.		
	6.		
	7.		
	8.		
V-2	1.		
	2.		
	3.		
	4.		
30	5.	INF	
	6.	1 MEG	
	7.	INF	
	8.		
V-3	1.		
	2.		
	3.		
	4.		
	5.		
	6.		
	7.		
	8.		
V-4	1.		
	2.		
	3.		
	4.		
	5.		
	6.		
	7.		
	8.		
V-5	1.		
	2.		
	3.		
	4.		
T-1	1T02		
	A.		
	B.		
	C.		
	II.		

25

26

285

Symptoms

ST POINT DATA		RESISTANCE ACROSS INDIVIDUAL PARTS	
VOLTAGE	SIGNAL	PART	RESISTANCE
26	NORMAL	1	
	NORMAL	2	
	NORMAL	3	
	NORMAL	4	
	NORMAL	5	
	NORMAL	6	
	NORMAL	7	
	NORMAL	8	
	NORMAL	9	
	NORMAL	10	
27	NORMAL	1	
	NORMAL	2	
	NORMAL	3	
	NORMAL	4	
	NORMAL	5	
	NORMAL	6	
	NORMAL	7	
	NORMAL	8	
	NORMAL	9	
	NORMAL	10	
28	NORMAL	1	
	NORMAL	2	
	NORMAL	3	
	NORMAL	4	
	NORMAL	5	
	NORMAL	6	
	NORMAL	7	
	NORMAL	8	
	NORMAL	9	
	NORMAL	10	
29	NORMAL	1	
	NORMAL	2	
	NORMAL	3	
	NORMAL	4	
	NORMAL	5	
	NORMAL	6	
	NORMAL	7	
	NORMAL	8	
	NORMAL	9	
	NORMAL	10	

POWER TRANSFORMER CHECKS

TEST POINT	AC VOLTAGE	RESISTANCE
T-21 TO 3.		
5 TO 7.		
7 TO 9.		
6 TO 8.		
8 TO 10.		
6 TO 10.		
2 TO 4.		
1 TO GND (WITH 1 AND 3 DISCONNECTED FROM CIRCUIT).		
5 TO GND (WITH 5, 7, 9 DISCONNECTED FROM CIRCUIT).		
6 TO GND (WITH 6, 8, 10 DISCONNECTED FROM CIRCUIT).		
2 TO GND (WITH 2 AND 4 DISCONNECTED FROM CIRCUIT).		
2 TO GND (WITH 2 AND 4 CONNECTED TO CIRCUIT).		

Fig. 7.

Trouble

21. THE HIGH-PULL AMPLIFIER DOES NOT OPERATE AT ALL, ABSOLUTELY NO SOUND COMES FROM THE LOUSPEAKER INSPECTION REVEALS THAT ALL THE TUBES ARE MOUNTED CORRECTLY AND NO VACUOUS PHYSICAL DAMAGE LOCATE AND REPLACE THE PART CAUSING THE TROUBLE.

Remedy

RESULT OF PART REPLACEMENT

SR = SYMPTOMS REMAIN
 TC = TROUBLE CORRECTED

22	
PART	RESULT
1	SR
2	SR
3	SR
4	SR
5	SR
6	SR
7	SR
8	SR
9	SR
10	SR
11	SR
12	SR
13	SR
14	SR
15	SR
16	SR

23	
PART	RESULT
17	TC
18	TC
19	TC
20	TC
21	TC
22	TC
23	TC
24	TC
25	TC
26	TC
27	TC
28	TC
29	TC
30	TC
31	TC
32	TC

Symptoms

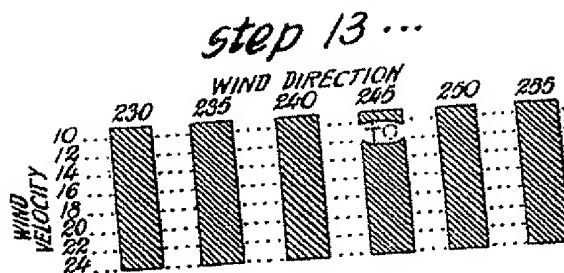
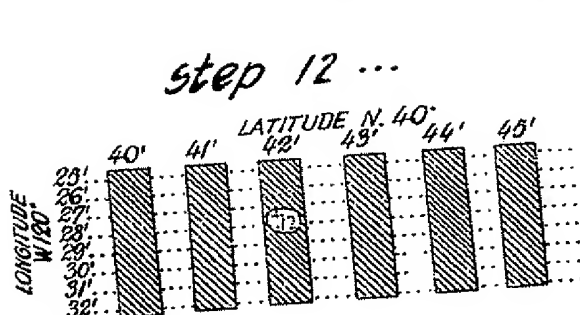
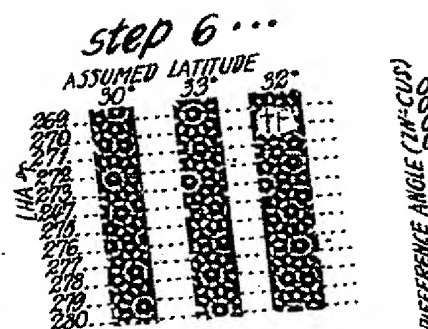
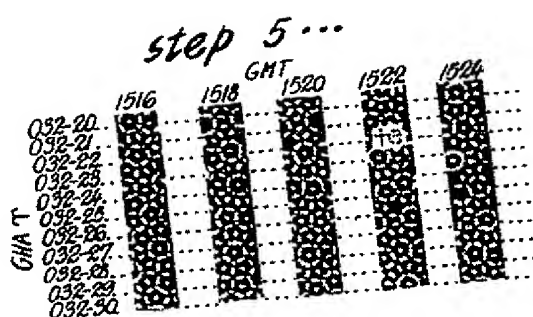
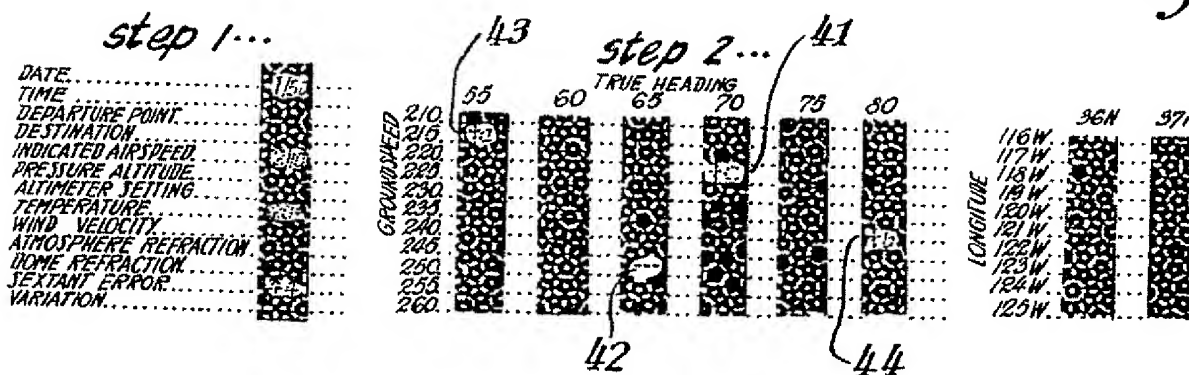
24		25		26		27		28		29	
TEST POINT	RESISTANCE	TEST POINT	VOLTAGE	TEST POINT	SIGNAL	TEST POINT	RESISTANCE	TEST POINT	VOLTAGE	TEST POINT	RESISTANCE
V-1	1	V-1	1	V-1	1	C-1	1	T-2	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
V-2	1	V-2	1	V-2	1	R-1	1	7	1	7	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
V-3	1	V-3	1	V-3	1	R-2	1	7	1	7	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
V-4	1	V-4	1	V-4	1	R-3	1	7	1	7	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
V-5	1	V-5	1	V-5	1	R-4	1	7	1	7	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7
F-1	1	F-1	1	F-1	1	R-5	1	7	1	7	1
2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7

POWER TRANSFORMER CHECKS

28		29	
TEST POINT	AC VOLTAGE	TEST POINT	RESISTANCE
T-2	1	1	1
3	2	2	2
4	3	3	3
5	4	4	4
6	5	5	5
7	6	6	6
8	7	7	7
9	8	8	8
10	9	9	9
11	10	10	10
12	11	11	11
13	12	12	12
14	13	13	13
15	14	14	14
16	15	15	15
17	16	16	16
18	17	17	17
19	18	18	18
20	19	19	19
21	20	20	20
22	21	21	21
23	22	22	22
24	23	23	23
25	24	24	24
26	25	25	25
27	26	26	26
28	27	27	27
29	28	28	28
30	29	29	29
31	30	30	30
32	31	31	31
33	32	32	32
34	33	33	33
35	34	34	34
36	35	35	35
37	36	36	36
38	37	37	37
39	38	38	38
40	39	39	39
41	40	40	40
42	41	41	41
43	42	42	42
44	43	43	43
45	44	44	44
46	45	45	45
47	46	46	46
48	47	47	47
49	48	48	48
50	49	49	49
51	50	50	50
52	51	51	51
53	52	52	52
54	53	53	53
55	54	54	54
56	55	55	55
57	56	56	56
58	57	57	57
59	58	58	58
60	59	59	59
61	60	60	60
62	61	61	61
63	62	62	62
64	63	63	63
65	64	64	64
66	65	65	65
67	66	66	66
68	67	67	67
69	68	68	68
70	69	69	69
71	70	70	70
72	71	71	71
73	72	72	72
74	73	73	73
75	74	74	74
76	75	75	75
77	76	76	76
78	77	77	77
79	78	78	78
80	79	79	79
81	80	80	80
82	81	81	81
83	82	82	82
84	83	83	83
85	84	84	84
86	85	85	85
87	86	86	86
88	87	87	87
89	88	88	88
90	89	89	89
91	90	90	90
92	91	91	91
93	92	92	92
94	93	93	93
95	94	94	94
96	95	95	95
97	96	96	96
98	97	97	97
99	98	98	98
100	99	99	99

1 TO GND (WITH 1 AND 5 DISCONNECTED FROM CIRCUIT)
 2 TO GND (WITH 2 AND 4 DISCONNECTED FROM CIRCUIT)
 3 TO GND (WITH 3 AND 6 DISCONNECTED FROM CIRCUIT)
 4 TO GND (WITH 4 AND 8 DISCONNECTED FROM CIRCUIT)
 5 TO GND (WITH 5 AND 10 DISCONNECTED FROM CIRCUIT)
 6 TO GND (WITH 6 AND 12 DISCONNECTED FROM CIRCUIT)
 7 TO GND (WITH 7 AND 14 DISCONNECTED FROM CIRCUIT)
 8 TO GND (WITH 8 AND 16 DISCONNECTED FROM CIRCUIT)
 9 TO GND (WITH 9 AND 18 DISCONNECTED FROM CIRCUIT)
 10 TO GND (WITH 10 AND 20 DISCONNECTED FROM CIRCUIT)
 11 TO GND (WITH 11 AND 22 DISCONNECTED FROM CIRCUIT)
 12 TO GND (WITH 12 AND 24 DISCONNECTED FROM CIRCUIT)
 13 TO GND (WITH 13 AND 26 DISCONNECTED FROM CIRCUIT)
 14 TO GND (WITH 14 AND 28 DISCONNECTED FROM CIRCUIT)
 15 TO GND (WITH 15 AND 30 DISCONNECTED FROM CIRCUIT)
 16 TO GND (WITH 16 AND 32 DISCONNECTED FROM CIRCUIT)
 17 TO GND (WITH 17 AND 34 DISCONNECTED FROM CIRCUIT)
 18 TO GND (WITH 18 AND 36 DISCONNECTED FROM CIRCUIT)
 19 TO GND (WITH 19 AND 38 DISCONNECTED FROM CIRCUIT)
 20 TO GND (WITH 20 AND 40 DISCONNECTED FROM CIRCUIT)
 21 TO GND (WITH 21 AND 42 DISCONNECTED FROM CIRCUIT)
 22 TO GND (WITH 22 AND 44 DISCONNECTED FROM CIRCUIT)
 23 TO GND (WITH 23 AND 46 DISCONNECTED FROM CIRCUIT)
 24 TO GND (WITH 24 AND 48 DISCONNECTED FROM CIRCUIT)
 25 TO GND (WITH 25 AND 50 DISCONNECTED FROM CIRCUIT)
 26 TO GND (WITH 26 AND 52 DISCONNECTED FROM CIRCUIT)
 27 TO GND (WITH 27 AND 54 DISCONNECTED FROM CIRCUIT)
 28 TO GND (WITH 28 AND 56 DISCONNECTED FROM CIRCUIT)
 29 TO GND (WITH 29 AND 58 DISCONNECTED FROM CIRCUIT)
 30 TO GND (WITH 30 AND 60 DISCONNECTED FROM CIRCUIT)
 31 TO GND (WITH 31 AND 62 DISCONNECTED FROM CIRCUIT)
 32 TO GND (WITH 32 AND 64 DISCONNECTED FROM CIRCUIT)
 33 TO GND (WITH 33 AND 66 DISCONNECTED FROM CIRCUIT)
 34 TO GND (WITH 34 AND 68 DISCONNECTED FROM CIRCUIT)
 35 TO GND (WITH 35 AND 70 DISCONNECTED FROM CIRCUIT)
 36 TO GND (WITH 36 AND 72 DISCONNECTED FROM CIRCUIT)
 37 TO GND (WITH 37 AND 74 DISCONNECTED FROM CIRCUIT)
 38 TO GND (WITH 38 AND 76 DISCONNECTED FROM CIRCUIT)
 39 TO GND (WITH 39 AND 78 DISCONNECTED FROM CIRCUIT)
 40 TO GND (WITH 40 AND 80 DISCONNECTED FROM CIRCUIT)
 41 TO GND (WITH 41 AND 82 DISCONNECTED FROM CIRCUIT)
 42 TO GND (WITH 42 AND 84 DISCONNECTED FROM CIRCUIT)
 43 TO GND (WITH 43 AND 86 DISCONNECTED FROM CIRCUIT)
 44 TO GND (WITH 44 AND 88 DISCONNECTED FROM CIRCUIT)
 45 TO GND (WITH 45 AND 90 DISCONNECTED FROM CIRCUIT)
 46 TO GND (WITH 46 AND 92 DISCONNECTED FROM CIRCUIT)
 47 TO GND (WITH 47 AND 94 DISCONNECTED FROM CIRCUIT)
 48 TO GND (WITH 48 AND 96 DISCONNECTED FROM CIRCUIT)
 49 TO GND (WITH 49 AND 98 DISCONNECTED FROM CIRCUIT)
 50 TO GND (WITH 50 AND 100 DISCONNECTED FROM CIRCUIT)

Fig



*

*

footnotes...

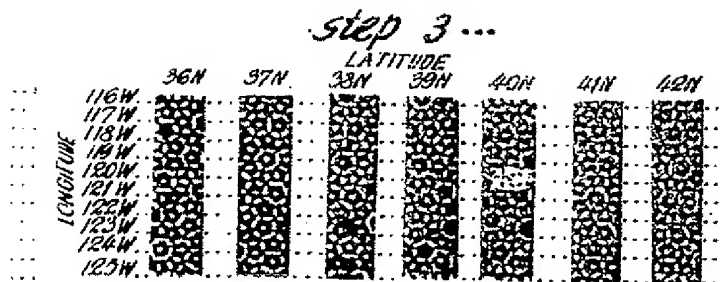
3 SHEETS

This drawing is a reproduction of the Original on a reduced scale.

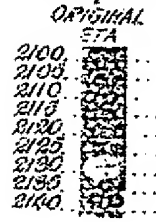
SHEET 3

Fig. 8.

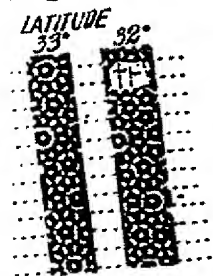
Yours Love



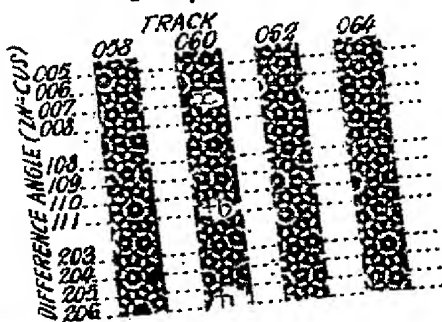
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76...



step 7...



steps 8-9-10...

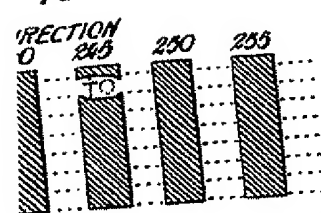
TABLE 1A CORRECTION		
1ST SHOT	2ND SHOT	3RD SHOT
-35	-4	0
-36	-4	-2
-36	-4	0
-35	-1	-3

step 11...

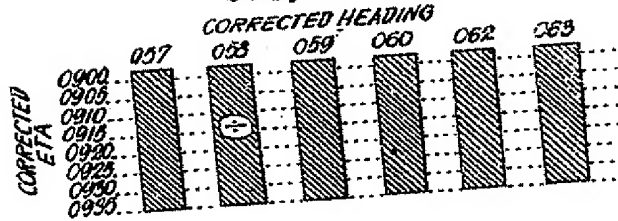
MOTION OF BODY

1ST SHOT	2ND SHOT	3RD SHOT
0	+15	+15
+15	+30	+30
0	-15	-15
-15	-30	-30

13...

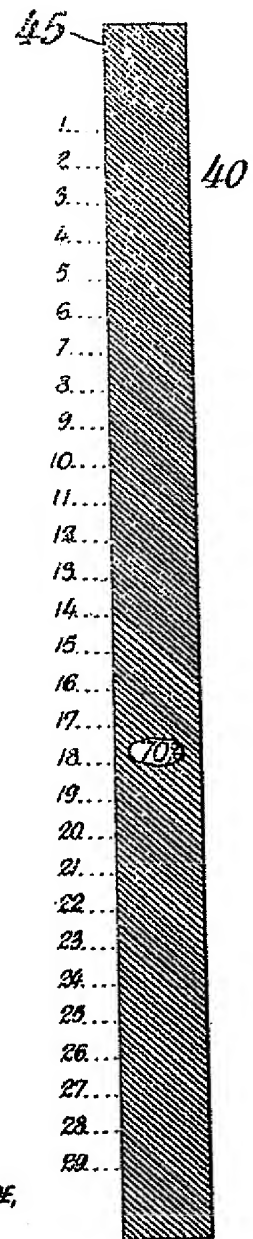


step 14 ...



tes . .

- | | |
|---|--|
| †a...WRONG; REFER TO TEXT PAGE 6 | †g...HS DENEK; 60-10 |
| †b...WRONG; REFER TO TEXT, PAGE 8 | †h...HS NUNKI; 25-01 |
| †c...SCHEDULED TIME OF OBSERVATION;
1516, 1520 & 1524, DR FOR 1520 | †i...HS ARCTURUS; 35-01 |
| †d...1ST. SHOT, DENEK
2ND. SHOT, NUNKI
3RD. SHOT, ARCTURUS | †j...HS DENEK; 58-13 |
| †e...ACTUAL TIME OF OBSERVATION
1516, 1521 & 1525 | †k...HS NUNKI; 24-05 |
| †f...FIX TIME; 1520 | †l...HS ARCTURUS; 30-27 |
| | †m...AFTER ADJUSTING PLOTTING LONGITUDE,
SHOW YOUR FIX POSITION |
| | †n...CORRECT HEADINGS AND WINDS |
| | †o...CORRECT ETA AND HEADING |



24-10-1964

Fig. 8.

